WHAT IS CLAIMED IS:

1. A toroidal-type continuously variable transmission, comprising:

a casing;

input and output disks respectively including inner surfaces, disposed concentrically with each other inside said casing, and supported in such a manner that they are rotated independently of each other;

a plurality of trunnions each including even-numbered pivot shafts existing at twisted positions which are at right angles to a central-axis direction of said input and output disks and disposed concentrically with to in parallel to each other, and being swingable about said pivot shafts;

a plurality of shift shafts respectively projected out from an inner surfaces of said trunnions;

a plurality of power rollers held by and between respective facing inner surfaces of said input and output disks in such a manner that they are rotatably supported on said shift shafts; and

a support member fixed directly to said casing and supporting said pivot shafts of said trunnions in such a manner that they are shifted in an axial direction thereof and in an ~~inclined rotation direction thereof~~.

~~2. The toroidal-type continuously variable transmission~~

as set forth in Claim 1, further including:

a plurality of needle roller bearings for supporting said pivot shafts of said trunnions on said support member; and

a plurality of spherical-surface bearings for supporting said needle roller bearings;

wherein said spherical-surface bearings each includes spherical-surface-shaped inner and outer races.

3. The toroidal-type continuously variable transmission as set forth in Claim 2, wherein said outer race of said spherical-surface bearing include one cut-out portion in an inner peripheral surface of spherical surface thereof, and

said inner race is press-fitted said outer race from said cut-out portion to thereby unite said inner and outer races as an integral body.

4. The toroidal-type continuously variable transmission as set forth in Claim 2, wherein said support member and said outer race of said spherical-surface bearing are formed as an integral body.

5. The toroidal-type continuously variable transmission as set forth in Claim 2, wherein said axial-direction shifting movement of said trunnion is carried out between said pivot shaft and said needle roller bearing by a sliding movement of said

trunnion.

a2 6. The toroidal-type continuously variable transmission as set forth in Claim 2, wherein said axial-direction shifting movement of said trunnion is carried out between said needle roller bearing and said spherical-surface bearing by a sliding movement of said trunnion.

7. A toroidal-type continuously variable transmission, comprising:

a casing;

input and output disks respectively including inner surfaces, disposed concentrically with each other inside said casing, and supported in such a manner that they are rotated independently of each other;

a plurality of trunnions each including an even-numbered pivot shafts of upper and lower portions thereof existing at twisted positions which are at right angles to a central-axis direction of said input and output disks and disposed concentrically with or in parallel to each other, said trunnions respectively being swingable about said pivot shafts;

a plurality of shift shafts respectively projected out from said inner surfaces of said trunnions;

a plurality of power rollers held by and between respective facing inner surfaces of said input and output disks in such

a manner that they are rotatably supported on said shift shafts; and,

upper and lower support members respectively supporting said pivot shafts of upper and lower portions of said trunnions,

wherein one of said upper and lower support members is fixed directly to said casing and the other of said upper and lower support members is swingably supported on said casing.

8. The toroidal-type continuously variable transmission as set forth in Claim 7, wherein said toroidal-type continuously variable transmission is installed into a vehicle of an FR type, said upper support member is fixed directly to said casing, and said lower support member is swingably supported on said casing.

9. The toroidal-type continuously variable transmission as set forth in Claim 7, wherein said pivot shafts of said trunnions are respectively supported by their associated radial needle roller bearings and ball splines in such a manner that they are swingingly shifted and are shifted in an axial direction thereof.

10. The toroidal-type continuously variable transmission as set forth in Claim 9, wherein each of said ball splines is disposed on an outer periphery of said radial needle roller bearing.

11. A toroidal-type continuously variable transmission, comprising:

a casing;

input and output disks respectively including inner surfaces, and supported concentrically with each other in such a manner that their respective inner surfaces opposed to each other and they are supported rotatably in an inside of said casing;

a plurality of trunnions respectively including a plurality of pivot shafts disposed at twisted positions with respect to a central-axes of said input and output disks, wherein said trunnions being swingable about said pivot shafts;

a plurality of shift shafts supported in such a manner that they are projected from an inner surfaces of said trunnions;

a plurality of power rollers respectively held by and between said input and output disks in such a manner that they are rotatably supported on peripheries of said shift shafts; and,

a yoke fixed directly to said casing and including a bearing for supporting said pivot shafts of said trunnions.

12. The toroidal-type continuously variable transmission as set forth in Claim 11, wherein said bearing disposed on said yoke, comprising:

an outer race fixed to said yoke;

an inner race formed by an outer peripheral surface of said pivot shaft of said trunnion; and,

a roller rollably interposed between said outer race and said inner race,

wherein said bearing supports said pivot shafts of each of said trunnions in such a manner that said pivot shafts shift in an axial direction thereof and in an inclined rotation direction thereof, a raceway surface of said inner race is formed as a straight-shaped surface extending in said axial direction of said pivot shaft, a raceway surface of said outer race is formed as a curved surface having a given radius of curvature, and an outer peripheral surface of said roller to be contacted with said inner race and said outer race is formed as a curved surface having a given radius of curvature.

13. The toroidal-type continuously variable transmission as set forth in Claim 11, wherein said bearing disposed on said yoke, comprising:

an outer race fixed to said yoke;

an inner race formed by an outer peripheral surface of said pivot shaft of said trunnion; and

a roller rollably interposed between said outer race and said inner race,

wherein said bearing supports said pivot shafts of each

of said trunnions in such a manner that said pivot shafts shift in an axial direction thereof and in an inclined rotation direction thereof, a raceway surface of said outer race is formed in a straight-shaped surface extending in said axial direction of said pivot shaft, a raceway surface of said inner race is formed as a curved surface having a given radius of curvature, and a outer peripheral surface of said roller to be contacted with said inner race and said outer race is formed as a curved surface having a given radius of curvature.

14. The toroidal-type continuously variable transmission as set forth in Claim 11, wherein said bearing disposed on said yoke, comprising:

a needle roller to be contacted with said pivot shaft of said trunnion; and

a spherical-surface bearing,

wherein said bearing supports said pivot shafts of said trunnion in such a manner that said pivot shafts can be shifted in an axial direction thereof and in an inclined rotation direction thereof, and said needle roller is divided in said axial direction of said pivot shaft into a plurality of parts.

15. The toroidal-type continuously variable transmission as set forth in Claim 11, wherein said bearing disposed on said yoke, comprising:

a needle roller to be contacted with said pivot shaft of said trunnion; and,

a spherical-surface bearing,

wherein said bearing supports said pivot shafts of said trunnion in such a manner that said pivot shafts shift in an axial direction thereof and in an inclined rotation direction thereof, and

wherein said spherical-surface bearing includes an outer race fixed to said yoke and an inner race to be spherical-surface connected to said outer race and holding said needle roller,

a center of curvature of connecting surface of said inner race to be spherical-surface connected to said outer race of said spherical-surface bearing lies on said inclined rotation axis of said trunnion,

a center of curvature of connecting surface of said outer race to be spherical-surface connected to said inner race lies to keep away from said inclined rotation axis of said trunnion, and

said radius of curvature of connecting surface of said inner race is set smaller than said radius of curvature of connecting surface of said outer race.

16. The toroidal-type continuously variable transmission as set forth in Claim 11, wherein said bearing disposed on said yoke, comprising:

a needle roller to be contacted with said pivot shaft of said trunnion; and,

a spherical-surface bearing,

wherein said bearing supports said pivot shafts of said trunnion in such a manner that said pivot shafts can be shifted in an axial direction thereof and in an inclined rotation direction thereof,

said spherical-surface bearing includes an outer race fixed to said yoke, an inner race to be spherical-surface connected to said outer race and holding said needle roller,

a clearance is formed between said inner race and said outer race, and said central-axis of said outer race of said spherical-surface bearing is offset with respect to said inclined rotation axis of said trunnion.

17. The toroidal-type continuously variable transmission as set forth in Claim 16, wherein a center of curvature of connecting surface of said inner race to be spherical-surface connected to said outer race of said spherical-surface bearing lies on an inclined rotation axis of said trunnion,

a center of curvature of connecting surface of said outer race to be spherical-surface connected to said inner race lies to keep away from said inclined rotation axis of said trunnion, and

said radius of curvature of connecting surface of said

inner race is set smaller than said radius of curvature of connecting surface of said outer race.

18. The toroidal-type continuously variable transmission as set forth in Claim 16, wherein said radius of curvature of connection surface of said inner race and said radius of curvature of connection surface of said outer race are set equal to each other.

19. The toroidal-type continuously variable transmission as set forth in Claim 16, wherein said connecting surface of said outer race is formed as a straight-shaped surface.